

SPECIAL OBSERVATIONS.

SOLAR AND SKY RADIATION MEASUREMENTS DURING NOVEMBER, 1920.

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[Solar Radiation Investigations Section, Washington, Jan. 3, 1921.]

For a description of instruments and exposures, and an account of the methods of obtaining and reducing the measurements, the reader is referred to this REVIEW for April, 1920, 48:225.

On account of unusually cloudy conditions but few solar radiation intensity measurements were obtained at any of the stations during November. Lincoln, Nebr., reports only 4 days in the month with average cloudiness less than 3.9, and solar radiation intensity measurements were obtained on only 5 days. During the last decade the sky was almost continuously overcast at all the stations except Santa Fe. However, the monthly means of such measurements as were obtained, differ but little from normal values for November, as shown by the departures in Table 1.

Table 2 shows a deficiency in the total radiation for the month at all the stations, the departure from normal being especially marked during the latter part of the month.

Skylight polarization measurements made at Madison on two days give a maximum of 79 per cent on the 4th and a mean of 76 per cent. At Washington measurements made on 6 days give a mean of 63 per cent and a maximum of 65 per cent on the 13th. These latter are about normal values for Washington in November, but the maximum obtained at Madison is the highest polarization measurement ever obtained at that station.

TABLE 1.—Solar radiation intensities during November, 1920.

[Gram-calories per minute per square centimeter of normal surface.]

WASHINGTON, D. C.

| Date. | Sun's zenith distance. | | | | | | | | | | | Local mean solar time. |
|------------|--------------------------------------|-----------|-------|-------|-------|--------|-------|-------|-------|-------|-------|------------------------|
| | 8 a.m. | 78.7° | 75.7° | 70.7° | 60.0° | 0.0° | 60.0° | 70.7° | 75.7° | 78.7° | Noon. | |
| | 75 th me- rid- ian time. | Air mass. | | | | | | | | | | |
| | | A. M. | | | | | *1.0 | P. M. | | | | |
| | | e. | 5.0 | 4.0 | 3.0 | 2.0 | | 2.0 | 3.0 | 4.0 | 5.0 | |
| Nov. 3 | mm. | cal. | cal. | cal. | cal. | cal. | cal. | cal. | cal. | cal. | mm. | |
| 4 | 4.37 | 0.68 | 0.93 | 1.09 | 1.24 | 1.37 | 1.18 | 1.02 | 0.84 | 0.77 | 5.16 | |
| 5 | 5.36 | 0.76 | 0.83 | 0.97 | 1.22 | 1.37 | 1.18 | 0.97 | 0.88 | 0.79 | 5.36 | |
| 6 | 5.79 | | 0.76 | 0.86 | 0.98 | 1.25 | 1.15 | 1.01 | 0.92 | 0.77 | 4.95 | |
| 13 | 5.36 | | | | 1.25 | | | | | | 3.99 | |
| 18 | 1.78 | | 0.91 | 1.03 | 1.32 | | 1.28 | 1.16 | 0.97 | 0.81 | 1.78 | |
| Means | 3.99 | 0.72 | 0.87 | 1.03 | 1.19 | (1.37) | 1.20 | 1.04 | 0.90 | 0.78 | 4.37 | |
| Departures | | -0.04 | +0.02 | +0.01 | +0.05 | | +0.03 | +0.06 | +0.08 | +0.05 | | |

* Extrapolated.

TABLE 1.—Solar radiation intensities during November, 1920—Contd.

MADISON, WIS.

| | | Sun's zenith distance. | | | | | | | | | | | |
|-----------------|--------------------------------|------------------------|-------|-------|------|------|------|-------|------|------|-------|---------------------------------|----|
| 8 a.m. | | 78.7 | 75.7 | 70.7 | 60.0 | 0.0 | 60.0 | 70.7 | 75.7 | 78.8 | Noon. | | |
| Date. | 75th meri- dian time. | Air mass. | | | | | | | | | | Local mean solar time. | |
| | | A. M. | | | | | *1.0 | P. M. | | | | | |
| | | e. | 5.0 | 4.0 | 3.0 | 2.0 | | 2.0 | 3.0 | 4.0 | 5.0 | | |
| | | | | | | | | | | | | | e. |
| Nov. 4..... | mm. | cal. | cal. | cal. | cal. | cal. | cal. | cal. | cal. | cal. | mm. | | |
| 10..... | 2.06 | | | 1.20 | 1.37 | 1.60 | | 1.30 | | | 3.45 | | |
| 13..... | 1.60 | | | 1.15 | 1.36 | 1.60 | | 1.14 | | | 1.45 | | |
| 16..... | 2.36 | | | 1.21 | 1.35 | | | 1.17 | | | 1.96 | | |
| 17..... | 2.36 | | 0.79 | | | | | | | | 2.26 | | |
| 18..... | 3.81 | 0.59 | 0.72 | 0.89 | 1.09 | 1.35 | | | | | 3.00 | | |
| Means..... | (0.59) | (0.76) | 1.11 | 1.31 | 1.53 | | | 1.17 | | | 3.99 | | |
| Departures..... | -0.28 | -0.25 | -0.04 | +0.01 | | | | ±0.00 | | | | | |

LINCOLN, NEBR.

| | | | | | | | | | | | |
|-----------------|--------|--------|-------|--------|--------|--------|-------|-------|-------|-------|------|
| Nov. 2..... | 1.24 | 0.96 | | 1.23 | 1.43 | 1.64 | 1.43 | 1.28 | 1.15 | 1.06 | 3.30 |
| 4..... | 4.17 | | 1.14 | 1.26 | 1.43 | 1.60 | | 1.27 | 1.15 | 1.03 | 3.99 |
| 11..... | 1.78 | | 1.16 | 1.27 | | | | | | | 1.88 |
| 16..... | 2.16 | | | | | | | 1.37 | 1.21 | 1.06 | 0.94 |
| Means..... | (0.96) | (1.15) | 1.25 | (1.43) | (1.62) | (1.40) | 1.25 | 1.12 | 1.01 | | 2.62 |
| Departures..... | -0.02 | +0.08 | +0.03 | +0.06 | | | +0.01 | +0.04 | +0.06 | +0.07 | |

SANTA FE, N. MEX.

| | | | | | | | | | | | |
|-----------------|-------|-------|-------|-------|------|-------|-------|-------|------|--|------|
| Nov. 4..... | 1.96 | | | 1.25 | | | 1.44 | | | | 2.87 |
| 8..... | 3.63 | | 1.18 | 1.27 | 1.47 | | 1.45 | 1.40 | 1.27 | | 3.15 |
| 12..... | 3.15 | | | | | | 1.47 | 1.32 | | | 2.87 |
| 17..... | 2.87 | 1.12 | 1.22 | 1.33 | 1.45 | 1.58 | | | | | 3.45 |
| 18..... | 3.45 | | | | | 1.59 | 1.49 | 1.37 | 1.23 | | 3.81 |
| 19..... | 3.30 | | | | | | 1.50 | 1.35 | 1.22 | | 3.30 |
| 20..... | 3.30 | | | | | | 1.43 | | | | 3.63 |
| 22..... | 2.87 | 1.08 | | | | | | 1.32 | | | 3.00 |
| 27..... | 2.74 | | | | | | | 1.28 | 1.19 | | 2.06 |
| 29..... | 1.78 | 1.23 | 1.33 | 1.43 | 1.54 | 1.66 | 1.52 | 1.35 | 1.27 | | 2.06 |
| 30..... | 1.96 | 1.25 | 1.33 | 1.44 | 1.57 | | | | | | 1.96 |
| Means..... | 1.17 | 1.26 | 1.34 | 1.51 | 1.61 | 1.47 | 1.34 | 1.24 | | | |
| Departures..... | +0.01 | +0.03 | -0.02 | +0.04 | | +0.01 | +0.03 | +0.05 | | | |

* Extrapolated.

TABLE 2.—Solar and sky radiation received on a horizontal surface.

| Week beginning— | Average daily radiation. | | | Average daily departure for the week. | | | Excess or deficiency since first of year. | | |
|-----------------|--------------------------|----------|----------|---------------------------------------|----------|----------|-------------------------------------------|----------|----------|
| | Washington. | Madison. | Lincoln. | Washington. | Madison. | Lincoln. | Washington. | Madison. | Lincoln. |
| | cal. | cal. | cal. | cal. | cal. | cal. | cal. | cal. | cal. |
| Oct. 29..... | 278 | 170 | 233 | + 27 | - 19 | - 8 | +379 | +1659 | |
| Nov. 5..... | 239 | 136 | 133 | + 6 | - 37 | - 94 | +424 | +1401 | |
| 12..... | 168 | 209 | 231 | - 42 | +53 | + 22 | +127 | +1773 | |
| 19..... | 161 | 52 | 107 | - 28 | - 89 | - 91 | - 72 | +1147 | |
| 26..... | 70 | 59 | 76 | -101 | -72 | -109 | -781 | + 642 | |